

WHAT IS CLAIMED IS:

1. An information recording medium comprising a data recording area, wherein:

a lead-in area and a volume space are allocated in the data recording area in advance;

the volume space is constructed so as to allow a logical zone for recording at least a volume-file structure and an over-run protection area for preventing an access to an unrecorded area to be alternately allocated in the volume space;

the lead-in area and the over-run protection area each include a chain volume management information area for storing chain volume management information; and

the chain volume management information includes address information of a subsequent logical zone and address information of a subsequent chain volume management information area.

2. An information recording medium according to claim 1, wherein the chain volume management information area is provided at a fixed position in the over-run protection area, and the address information of the subsequent chain volume management information area indicates a head address of the subsequent over-run protection area.

3. An information recording medium according to claim 1, wherein:

the volume space is constructed so as to allow a lead-out area subsequent to a last over-run protection area to be allocated in the volume space; and

dummy data is recorded in the chain volume management information area included in the last over-run

protection area.

4. An information recording medium comprising a data recording area, wherein:

a lead-in area and a volume space are allocated in the data recording area in advance;

the volume space is constructed so as to allow an advanced VAT structure area for storing at least an advanced VAT to be allocated in the volume space;

the advanced VAT is information for managing a correspondence between a virtual address indicating an address in a virtual address space and a logical address indicating an address in a logical address space; and

basic structure information indicating a file structure is provided at a specific virtual address in the advanced VAT, the basic structure information being indispensable for searching all files recorded in the information recording medium.

5. An information recording medium according to claim 1, wherein:

the basic structure information includes VAT entries for a file set descriptor and a file entry of a root directory; and

the advanced VAT includes a first VAT entry for assigning a logical address of the file set descriptor to a virtual address 0, and a second VAT entry for assigning a logical address of the file entry of the root directory to a virtual address 1.

6. An information recording medium according to claim 4, wherein the advanced VAT structure area is allocated at an end of an accessible area.

7. An information recording medium according to claim 4, wherein:

specific application structure information indicating a file structure is allocated in a specific virtual address range in the advanced VAT, the specific application structure information being indispensable for searching an AVfile recorded in the information recording medium; and

the basic structure information and the specific application structure information are recorded within one sector from a head of the advanced VAT.

8. An information recording medium according to claim 7, wherein the advanced VAT structure area is allocated at an end of an accessible area.

9. An information recording medium according to claim 4, wherein:

the volume space is constructed so as to allow a logical zone for recording at least a volume-file structure and an over-run protection area for preventing an access to an unrecorded area to be alternately allocated in the volume space;

the lead-in area and the over-run protection area each include a chain volume management information area for recording chain volume management information; and

the chain volume management information includes address information of a subsequent logical zone and address information of a subsequent chain volume management information area.

10. An information recording medium according to claim 8,

wherein the chain volume management information area is allocated at a fixed position in the over-run protection area, and the address information of the subsequent chain volume management information area indicates a head address of the subsequent over-run protection area.

11. An information recording medium according to claim 8, wherein:

the volume space is constructed so as to allow a lead-out area subsequent to a last over-run protection area to be allocated in the volume space; and

dummy data is recorded in the chain volume management information area included in the last over-run protection area.

12. An information recording medium according to claim 8, wherein:

the basic structure information includes VAT entries for a file set descriptor and a file entry of a root directory; and

the advanced VAT includes a first VAT entry for assigning a logical address of the file set descriptor to a virtual address 0, and a second VAT entry for assigning a logical address of the file entry of the root directory to a virtual address 1.

13. An information recording medium according to claim 8, wherein specific application structure information indicating a file structure is allocated in a specific virtual address range in the advanced VAT, the specific application structure information being indispensable for searching an AVfile recorded in the information recording medium.

14. An information recording medium according to claim 13, wherein the basic structure information and the specific application structure information are recorded within one sector from a head of the advanced VAT.

15. An information recording medium according to claim 8, wherein the advanced VAT structure area is allocated at an end of an accessible area.

16. A method for recording information into an information recording medium comprising a data recording area, wherein:

a lead-in area and a volume space are allocated in the data recording area in advance; and

the method comprises the step of:

allocating a logical zone for recording at least a volume-file structure and an-over-run protection area for preventing an access to an unrecorded area alternately in the volume space;

the lead-in area and the over-run protection area each include a chain volume management information area; and

the method further comprises the step of:

recording the chain volume management information including address information of a subsequent logical zone and address information of a subsequent chain volume management information into the chain volume management information area.

17. A method for recording information into an information recording medium comprising a data recording area, wherein:

a lead-in area and a volume space are allocated in the data recording area in advance; and

the method comprises the steps of:

allocating an advanced VAT structure area in the volume space; and

recording an advanced VAT for managing a correspondence between a virtual address indicating an address in a virtual address space and a logical address indicating an address in a logical address space into the advanced VAT structure area; and

basic structure information indicating a file structure is allocated at a specific virtual address in the advanced VAT, the basic structure information being indispensable for searching all files recorded in the information recording medium.

18. A method according to claim 17, wherein:

specific application structure information indicating a file structure is allocated in a specific virtual address range in the advanced VAT, the specific application structure information being indispensable for searching an AVfile recorded in the information recording medium; and

the basic structure information and the specific application structure information are provided within one sector from a head of the advanced VAT.

19. A method according to claim 17, wherein:

the method comprises the step of:

allocating a logical zone for recording at least a volume-file structure and an over-run protection area for preventing an access to an unrecorded area alternately in the volume space;

the lead-in area and the over-run protection area each include a chain volume management information area;

and

the method comprises the step of:

recording the chain volume management information including address information of a subsequent logical zone and address information of a subsequent chain volume management information into the chain volume management information area.

20. A device for recording information into an information recording medium comprising a data recording area, wherein:

a lead-in area and a volume space are allocated in the data recording area in advance;

the device comprises:

a section for allocating a logical zone for recording at least a volume-file structure and an over-run protection area for preventing an access to an unrecorded area alternately in the volume space;

the lead-in area and the over-run protection area each include a chain volume management information area; and

the device further comprises:

a section for recording the chain volume management information including address information of a subsequent logical zone and address information of a subsequent chain volume management information into the chain volume management information area.

21. A device for recording information into an information recording medium comprising a data recording area, wherein:

a lead-in area and a volume space are allocated in the data recording area in advance; and

the device comprises:

a section for allocating an advanced VAT

structure area in the volume space; and

a section for recording an advanced VAT for managing a correspondence between a virtual address indicating an address in a virtual address space and a logical address indicating an address in a logical address space into the advanced VAT structure area; and

basic structure information indicating a file structure is allocated at a specific virtual address in the advanced VAT, the basic structure information being indispensable for searching all files recorded in the information recording medium.

22. A device according to claim 21, wherein:

specific application structure information indicating a file structure is allocated in a specific virtual address range in the advanced VAT, the specific application structure information being indispensable for searching an AVfile recorded in the information recording medium; and

the basic structure information and the specific application structure information are provided within one sector from a head of the advanced VAT.

23. A device according to claim 21, wherein:

the device comprises:

a section for allocating a logical zone for recording at least a volume-file structure and an overrun protection area for preventing an access to an unrecorded area alternately in the volume space;

the lead-in area and the over-run protection area each include a chain volume management information area; and

the device comprises:

a section for recording the chain volume management information including the address information of a subsequent logical zone and the address information of a subsequent chain volume management information into the chain volume management information area.

24. A method for reproducing information recorded in an information recording medium comprising a data recording area, wherein:

a lead-in area and a volume space are allocated in the data recording area in advance, a logical zone for recording at least a volume-file structure and an over-run protection area for preventing an access to an unrecorded area are alternately allocated in the volume space, the lead-in area and the over-run protection area each include a chain volume management information area, and the chain volume management information including address information of a subsequent logical zone and address information of a subsequent chain volume management information area is recorded in the chain volume management information area; and

the method comprises the steps of:

accessing the chain volume management information area included in each of the lead-in area and the over-run protection area in a chained manner; and

performing a reproduction operation in accordance with information read out from the chain volume management information area.

25. A method for reproducing information recorded in an information recording medium comprising a data recording area, wherein:

a lead-in area and a volume space are allocated in

the data recording area in advance, a volume structure area and an advanced VAT structure area are allocated in the volume space, an advanced VAT information for managing a correspondence between a virtual address indicating an address in a virtual address space and a logical address indicating an address in a logical address space is recorded in the advanced VAT structure area, and basic structure information indicating a file structure is allocated at a specific virtual address in the advanced VAT, the basic structure information being indispensable for searching all files recorded in the information recording medium; and the method comprises the steps of:

obtaining a logical address of the basic structure information from the advanced VAT stored in the advanced VAT structure area without accessing the volume structure area; and

reading out the basic structure information in accordance with the logical address of the basic structure information.

26. A method for reproducing information recorded in an information recording medium comprising a data recording area, wherein:

a lead-in area and a volume space are allocated in the data recording area in advance, an advanced VAT structure area is allocated in the volume space, advanced VAT information for managing a correspondence between a virtual address indicating an address in a virtual address space and a logical address indicating an address in a logical address space is recorded in the advanced VAT structure area, basic structure information indicating a file structure is allocated at a specific virtual address in the advanced VAT, the basic structure information being indispensable for

searching all files stored in the information recording medium, specific application structure information indicating a file structure is allocated in a specific virtual address range in the advanced VAT, the specific application structure information being indispensable for searching an AVfile recorded in the information recording medium, and the basic structure information and the specific application structure information are allocated within one sector from a head of the advanced VAT; and

the method comprises the steps of:

reading out information within one sector from a head of the advanced VAT recorded in the advanced VAT structure area; and

performing a reproduction operation based on the basic structure information and the specific application structure information included in the read out information.

27. A method according to ~~claim 25~~, wherein:

a logical zone for storing at least a volume-file structure and an over-run protection area for preventing an access to an unrecorded area are alternately allocated in the volume space, the lead-in area and the over-run protection area each include a chain volume management information area, and the chain volume management information including address information of a subsequent logical zone and address information area of a subsequent chain volume management information is recorded in the chain volume management information area; and

the method comprises the steps of:

accessing the chain volume management information area included in each of the lead-in area and the over-run protection area in a chained manner; and

performing a reproduction operation in accordance with information read out from the chain volume management information area.

28. A device for reproducing information recorded in an information recording medium comprising a data recording area, wherein:

a lead-in area and a volume space are allocated in the data recording area in advance, a logical zone for storing at least a volume-file structure and an over-run protection area for preventing an access to an unrecorded area are alternately allocated in the volume space, the lead-in area and the over-run protection area each include a chain volume management information area, and the chain volume management information area including address information of a subsequent logical zone and address information of a subsequent chain volume management information area is recorded in the chain volume management information area; and

the device comprises:

a section for accessing the chain volume management information area included in each of the lead-in area and the over-run protection area in a chained manner; and

a section for performing a reproduction operation in accordance with information read out from the chain volume management information area.

29. A device for reproducing information recorded in an information recording medium comprising a data recording area, wherein:

a lead-in area and a volume space are allocated in the data recording area in advance, a volume structure area

and an advanced VAT structure area are allocated in the volume space, an advanced VAT information for managing a correspondence between a virtual address indicating an address in a virtual address space and a logical address indicating an address in a logical address space is recorded in the advanced VAT structure area, and basic structure information indicating a file structure is allocated at a specific virtual address in the advanced VAT, the basic structure information being indispensable for searching all files recorded in the information recording medium; and the device comprises:

a section for obtaining a logical address of the basic structure information from the advanced VAT stored in the advanced VAT structure area without accessing the volume structure area; and

a section for reading out the basic structure information in accordance with the logical address of the basic structure information.

30. A device for reproducing information recorded in an information recording medium comprising a data recording area, wherein:

a lead-in area and a volume space are allocated in the data recording area in advance, an advanced VAT structure area is allocated in the volume space, an advanced VAT for managing a correspondence between a virtual address indicating an address in a virtual address space and a logical address indicating an address in a logical address space is recorded in the advanced VAT structure area, basic structure information indicating a file structure is allocated at a specific virtual address in the advanced VAT, the basic structure information being indispensable for searching all files recorded in the information recording

medium, specific application structure information indicating a file structure is allocated in a specific virtual address range in the advanced VAT, the specific application structure information being indispensable for searching an AVfile recorded in the information recording medium, and the basic structure information and the specific application structure information are provided within one sector from a head of the advanced VAT; and

the device comprises:

a section for reading out information within one sector from a head of the advanced VAT recorded in the advanced VAT structure area; and

a section for performing a reproduction operation based on the basic structure information and the specific application structure information included in the read out information.

31. A device according to claim 29, wherein:

a logical zone for recording at least a volume-file structure and an over-run protection area for preventing an access to an unrecorded area are alternately allocated in the volume space, the lead-in area and the over-run protection area each include a chain volume management information area, and the chain volume management information including address information of a subsequent logical zone and address information of a subsequent chain volume management information is recorded in the chain volume management information area; and

the device comprises:

a section for accessing the chain volume management information area included in each of the lead-in area and the over-run protection area in a chained manner; and

a section for performing a reproduction operation in accordance with information read out from the chain volume management information area.

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